(2) means mounted to said vehicle for indicating a [the] dumping of the load carried by said body;

(3) means mounted to said vehicle for indicating a [the] direction of movement by said vehicle;

a first processor means on-board said vehicle for acquiring data generated from means (1), (2) and (3) and organizing said acquiring data for downloading to a remote control center; and

(4) means for sending said acquired data to said remote control center and for receiving control signals therefrom.

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2. (Thrice Amended) An apparatus as set forth in claim [105] 103 wherein said first processor means includes (1) memory means for storing data indicative of a predetermined maximum weight capacity for said dump body, (2) detection means responsive to incremental increases in the total weight of said dump body for determining an [the] approximate weight of material added by a bucket of a loader, (3) comparison means responsive to said memory, first processor and detection means for determining if [the] a total weight minus said predetermined maximum weight for said dump body is a fraction of [the] said approximate weight of material in said bucket, and (4) display means responsive to said comparison means for displaying [the] a remaining weight capacity of said truck body.

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4. (Twice Amended) An apparatus as set forth in claim [2] 105 wherein said processor means includes means for isolating pressure data representing pressure spikes and means for recording the occurrence of a pressure spike, and means responsive to [the] said recording means for delivering data to said display means indicative of [the] a condition of a road over which said vehicle travels.

5. (Twice Amended) An apparatus as set forth in claim 2 wherein said display means includes a display of [the] said remaining weight capacity of said dump body as a percentage of [the] said approximate weight of material carried by said bucket.

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6. (Once Amended) An apparatus as set forth in claim 5 wherein said display means comprises a series of light indicators representative of [the] an approximate capacity of [a] said bucket, said light indicators being relatively positioned such that each of said light indicators visually represents a fractional portion of said approximate [the] capacity of [the] said bucket.

8. (Twice Amended) An apparatus as set forth in claim 2 wherein said body is pivotally mounted to said frame by way of a hinge assembly such that said pressure sensor assembly supports [the entire] said weight of said dump body in [its] a lowered position on said frame along the interface between said frame and dump body with none of [the] said weight of [the load] said dump body transferred to [the] said frame via said hinge assembly.

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9. (Twice Amended) An apparatus as set forth in claim 8 wherein said hinge assembly has body and frame portions and also has means for decoupling said body and frame portions when said dump body is moved to [its] said lowered position such that [the entire] said weight of said dump body is communicated to said frame through said pressure sensor assembly.

10. (Twice Amended) An apparatus as set forth in claim 105 wherein said pressure sensor assembly comprises at least one length of resilient tubing positioned on a beam of said frame wherein said resilient tubing provides an interface between said dump body and said frame for communicating said at least predetermined portion of [the] said weight of said dump body to said frame.

11. (Thrice Amended) An apparatus as set forth in claim [105] 103 including:

first transceiver means mounted to said vehicle;

said first processor means mounted to said vehicle and [said first processor means] operatively coupled to said first transceiver means and said pressure sensor assembly for receiving said data from said pressure sensor assembly, processing said data and transmitting data signals indicative of [the] a [vehicle's] hauling status for said vehicle by way of said first transceiver; and

said control center including a second processor means having a second transceiver means for communicating with said first transceiver means, said second processor means receiving said data signals from said first processor means, said data signals identifying [the] said vehicle and a [its] hauling status of said vehicle.

12. (Thrice Amended) An apparatus as set forth in claim 11 wherein said vehicle may be loaded by any one of a plurality of loaders,

said second processor means includes (1) first means for calculating in response to said data signals an average load time for each of said plurality of loaders, (2) second means responsive to said data and said first means for calculating [the] a current load delay time for each of said

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plurality of said loaders, (3) third means for identifying a one of said plurality of said [the] loaders [with the] having a minimum load delay, (4) fourth means for forming data for transmission by said second transceiver means, said data identifying a particular one of said plurality of vehicles and said one of said plurality of [the] loaders with said [the] minimum load delay [time]; and

said first processor means including fifth means responsive to data received from said fourth means by said first transceiver for displaying to an operator of said particular one of said plurality of vehicles an identifier [the number] of [the] said one of loaders [identified by the data to the operator of the vehicle identified by the data].

20. (Thrice Amended) An apparatus as set forth in claim 105 including:

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said first processor means providing an indication of a load or dump condition of said vehicle in response to pressure data from said pressure sensor assembly;

distance means for measuring the distance traveled by said vehicle between load and dump indications from said first processor means;

storage means responsive to said distance means and said pressure sensor assembly for storing [the] a distance traveled by said vehicle between load and dump sites and for storing [the] a total weight of [the] a load hauled by said vehicle between sites; and

means responsive to the storage means for multiplying [the] a distance traveled by [the] a weight hauled in order to provide a tons-miles record.

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21. (Twice Amended) An apparatus as set forth in claim 20 including, means for transmitting to said remote control center [the] said tons-miles record resulting from said multiplying means where said tons-miles record is divided by [the] a time interval between successive load and dump indications, thereby providing a measure of the wear experienced by the tires of said vehicle.

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33. (Twice Amended) An apparatus for processing data derived from [the] a weight of [the] a load carried by [the] a body of a truck, said apparatus comprising:

a truck frame including a hinge assembly for pivotally supporting said truck body between raised and lowered positions;

a pressure sensor assembly mounted to said frame for supporting [the] an entire weight of said body in its lowered position and providing pressure data representative of said entire [the] weight of said truck body;

a distance sensor for providing distance data to said processor means indicative of truck movement;

a processor means for receiving said pressure data and detecting a change in said entire [the] weight of said truck body and formulating data indicative of truck condition in response to said pressure data and its change; and

said [pressure] processor means including first means responsive to said pressure data for detecting said truck body raised off said pressure sensor assembly and second means responsive to said first means and said distance data for providing an output signal when said truck moves with said body raised off said pressure sensor assembly.

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~~34.~~ (Twice Amended) An apparatus for processing data derived from a [the] weight of a [the] load carried by a [the] body of a truck, said apparatus comprising:

a truck frame including a hinge assembly for pivotally supporting said truck body between raised and lowered positions;

a pressure sensor assembly mounted to said frame for supporting [the entire] a weight of said body in its lowered position and providing pressure data representative of said [the] weight of said truck body;

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a processor means for receiving said pressure data and detecting a change in [the] said weight of said truck body and formulating data indicative of such condition in response to said pressure data and its change; and

said processor means including (1) memory means for storing a predetermined tare weight of said truck body, (2) means responsive to [the] a lowering of said truck body onto said pressure sensor assembly after [the] a load carried by said body has been dumped for comparing said [the] weight of said truck body with said tare weight in said memory, and (3) means for indicating [the] said body is not fully empty when [the] said weight of [the] said body is greater than said tare weight of [the] said body plus a predetermined constant.

Sub F-2

35. (Twice Amended) An apparatus for determining a [the] remaining weight capacity of a body carried on a truck frame which is loaded with a material by [the] a bucket of a loader and for indicating when [the] a weight of [the] said material in a full average bucket is more than [the] a remaining weight capacity of [the] said body, said apparatus comprising in combination:

a truck frame including a hinge assembly;

a truck body pivotally mounted to said truck frame at said hinge assembly, said truck body being pivotally movable on said frame between lowered and raised positions;

a pressure sensor assembly mounted to said frame for supporting [the entire] a weight of said body in its lowered position and providing pressure data representative of [the] a weight of said truck body;

a processor means for receiving said pressure data and determining said [entire] weight of said truck body, said processor means including;

(1) memory means for storing data indicative of a predetermined maximum weight capacity for said truck body, (2) detection means responsive to incremental increases in [the total] said weight of said truck body for determining the approximate weight of said material added by [a] said bucket, (3) comparison means responsive to said [entire] weight, said predetermined maximum weight capacity and said approximate weight of material for determining [the] said remaining weight capacity of said truck body, and (4) display means responsive to said comparison means for displaying [the] said remaining weight capacity of said truck body.

~~44.~~ (Twice Amended) A system for minimizing a [the] hauling time for each of a plurality of trucks between load and dump sites, said system comprising:

a plurality of on-board weighing devices each mounted on one of said plurality of trucks for providing signals indicative of a truck's operation;

a plurality of processor means each mounted to one of said plurality of trucks and each processor means responsive to a one of said plurality of on-board weighing devices for receiving said signals from said one of said plurality of on-board weighing devices and processing said signals to provide data indicative of [the truck's] a hauling status;

a plurality of first transceiver means each mounted to one of said plurality of trucks for receiving said data indicative of a hauling status [data] from said one of said plurality of processor means and transmitting said hauling status data in association with additional data that identifies said one of said plurality of trucks; and

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a remote processing center including second transceiver means for receiving said hauling status and truck [identifiying] identifying data from said one of said plurality of first transceiver means, said remote processing center generating a historical data base, containing said data indicative of [the truck's] a hauling status and indexed by said identifying data.

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48 ~~46.~~ (Twice Amended) A system as set forth in claim ~~44~~ 46 wherein a plurality of loaders are provided at said load sites for loading said plurality of trucks; and

said remote processing center includes 1) first means for calculating in response to at least said data base an average load time for each of said plurality of loaders, 2) second means responsive to at least said data base and said first means for calculating [the] a current load delay time for each of said plurality of loaders, 3) third means responsive to said second means for identifying [the] one of said plurality of loaders with [the] a minimum load delay time, 4) fourth means responsive to said third means for forming control data for transmission by said second transceiver means, said control data identifying a particular one of said plurality of trucks and a particular one of said plurality of [the] loaders with [the] said minimum load delay time; and

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each of said plurality of processor means mounted to said plurality of trucks includes fifth means responsive to said control data received by said first transceiver for displaying [the number of the] for said particular one of said plurality

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of loaders identified by said control data [to the operator of the one of said plurality of trucks identified by said control data].

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~~49~~. (Twice Amended) A system as set forth in claim ~~44~~ wherein said processor means generates hauling status data for transmission in response to said signals from said pressure sensor assembly which are indicative of whether a particular one of said plurality of trucks is dumping its load, beginning a loading [of a new load] or in transit between load and dump sites.

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~~52~~. (Twice Amended) A method for detecting and recording [the] a degree of road roughness for a truck having a body supported on a frame, said method comprising the steps of:

periodically calculating [the] a value of a force derived from a weight of said truck body on said truck frame;

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storing said value [said force calculations] so as to accumulate a plurality of stored values;

periodically comparing a selected one of said plurality of stored values [force calculations] with other of said plurality of stored [force] values to determine if said one of said plurality of stored values is a spike wherein said spike is a stored value that is greater than said other of said plurality of stored values by a predetermined amount [force calculations is a force spike];

[counting the force] accumulating said spikes and providing a total count of said spikes; and

deriving from [the] said total count of [force] said spikes an indication of the degree of road roughness and displaying said indication.

55. (Twice Amended) A system for measuring the degree of tire use by a vehicle which hauls material in a dump body pivotally mounted to [the] a frame of said vehicle, said apparatus comprising;

distance means for measuring [the] a distance traveled by said vehicle and providing distance data;

an on-board weighing device responsive to a [for measuring the total] weight of a load of said material hauled by said vehicle for [and] providing 1) weight data and [for providing] 2) data indicative of [the] a beginning and ending of a haul cycle;

storage means responsive to said distance means and said on-board weighing device for accumulating [the] said distance and weight data; and

stationary processor means for receiving said weight and distance data, said stationary processor means including 1) means for time marking at least a portion of said distance and weight data so as to identify [the] an elapsed time of [each] said haul cycle, 2) means for determining [the] a total distance and [the] a weight of said material for [each] said haul cycle, 3) means for multiplying [the] said total distance and said weight of said material for [each] said haul cycle to provide a sum, 4) means for dividing said sum by said elapsed time [for each haul cycle], and 5) means for displaying [the] a value resulting from [the] said multiplying means.

58. (Twice Amended) An apparatus for use in connection with an off-road, heavy-duty truck wherein said apparatus records vital statistics of [the] said truck in connection with an identifier entered into [the] said apparatus by [the] a truck operator, said apparatus comprising:

a processor including memory means;

means coupled to said processor for entering [an] said identifier and associating a portion of said memory means with said identifier;

measuring means for providing signals indicative of [the] a hauling status of said truck to said processor means;

said processor means responsive to said measuring means for 1) receiving said signals, 2) providing data indicative of truck performance in response to said signals and 3) routing said manipulated data to locations within said portion of said memory means;

detecting means responsive to said entering means for detecting changes in said identifier; and

means responsive to said detecting means for transferring from said memory means the data in said portion of memory when a change of [the] said identifier has occurred.

60. (Twice Amended) A system for identifying an overload condition in an off-road, heavy-duty truck having a body mounted to a truck frame by a hinge assembly for movement between lowered and raised positions, said apparatus comprising, in combination:

a sensor assembly mounted on said truck frame and supporting a predetermined portion of [the] a weight of said truck body on said truck frame when said truck body is in said lowered position, said sensor assembly responding to said [the] weight of said body to provide a signal indicative of [the entire] said weight of said body;

a means for transferring said signal to a remote, off-board processor;

said remote off-board processor means responsive to said signal and including memory means for storing a predetermined maximum [load] weight capacity for said truck body; and

said processor means responsive to [including means for 1) determining a weight of said truck body from the] said signal [of] from said sensor assembly indicative of [the] said weight [of the load, 2)] for comparing [the] a weight indicated by said signal with said [the] predetermined maximum [load] weight capacity, and [3)] for generating an output signal if [the] said weight indicated by said signal is greater than [the] said predetermined maximum weight [load] capacity.

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~~61.~~ (Twice Amended) A system as set forth in claim ~~60~~ including means for displaying [the] said weight of said truck body.

62. (Twice Amended) A system as set forth in claim 60 including means in said processor means for accumulating [the] a total number of times [an] said output signal is generated [indicating an overload of the truck].

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~~63.~~ (Twice Amended) An apparatus for measuring and manipulating various hauling and loading parameters for an off-road, heavy duty truck having a body, a frame and front and rear axles, said apparatus comprising:

a first weighing device on said truck for measuring a first force of said truck body on said truck frame and providing data representative of said first force;

a second weighing device on said truck for measuring a second force of said truck body on said truck frame and providing data indicative of said second force;

a processor means responsive to said first and second weighing devices for determining [the] a fraction of [the] a total weight of said truck body over said [the] front axle and [the] a fraction of [the] said total weight of said truck body over [the] said rear axle of said truck; and

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display means responsive to said processor means for displaying said fractions of said total [the] weight[s] supported by said front and rear axles.

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75. (Twice Amended) In a system for controlling ~~the~~ routing of a fleet of vehicles composed of distinct groups to a plurality of possible locations, a method for monitoring and commanding vehicle movement comprising the steps of:

sensing [the] a weight and a change in said weight of a [the] load carried by each vehicle and formulating data representative of said weight and said change in weight;

transferring said data to a central location;

cataloging said data at said central location from each vehicle;

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selecting one of said distinct groups of vehicles;

combining said data from said one of said distinct groups of vehicles to provide collective data indicative of group performance; and

analyzing said cataloged and collective data to provide commands for transfer to selected vehicles.

76. (Twice Amended) In a system for controlling a [the] routing of a fleet of load-carrying vehicles composed of distinct groups to a plurality of possible locations, an apparatus for monitoring and commanding vehicle movement comprising, in combination:

first means on-board each vehicle in said fleet of vehicles for sensing a change in a load carried by said vehicle and forming data representative of said change;

second means on-board said vehicle for transmitting said data;

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a central computer for receiving said data from each vehicle in said fleet of vehicles and 1) cataloging said data to provide averages for ~~said~~ each vehicle, 2) formulating from said averages a data base for each of said ~~distinct~~ groups, 3) analyzing said averages from said each vehicle and said data base [each distinct group] and 4) forming control data in response to said analysis that includes I.D. data identifying at least one vehicle in said fleet of vehicles; and

transmitting means coupled to said central computer for transmitting said control data to [said identified] a vehicle identified by said I.D. data.

79. (Twice Amended) In a system as set forth in claim 76 wherein each [of said] vehicle[s] in said fleet of vehicles is loaded with material by a loader and said data from said [second] first on-board means provides ~~[of]~~ an indication of the operation of said loader;

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said central computer including means responsive to said data for providing a quantitative indication of the [loader] efficiency of said loader.

80. (Twice Amended) In a system as set forth in claim 76 wherein [said] each vehicle[s] in said fleet of vehicles includes a pivotal body mounted on a frame for movement between raised and lowered positions and said first on-board means includes a pressure sensor assembly mounted to said frame for supporting [the] an entire weight of said body in [its] said lowered position.

81. (Twice Amended) In a system as set forth in claim 76 wherein said on-board means includes means for detecting an increase in [the] said load carried by said vehicle.

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76 ~~82.~~ (Twice Amended) In a system as set forth in claim ~~80~~ wherein an interface is formed where said pivotal body meets said frame, said pressure sensor assembly is mounted on said frame such that said pressure sensor assembly extends continuously along said interface when said body is moved to [its] said lowered position.

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83. (Twice Amended) In a system for controlling the routing of a fleet of trucks composed of distinct groups to a plurality of possible locations and including a central computer for receiving data from said trucks and issuing commands to said trucks, [,] said trucks having a dump body pivotally mounted to a frame, an apparatus on-board each of said trucks comprising, in combination:

a pressure sensor assembly mounted to each truck in said fleet of trucks for providing pressure data indicative of [the] a weight of said dump body;

a processor means on-board each of said trucks for receiving said pressure data and detecting a change in [the] a weight of said body, and providing output data indicative of a truck operating condition; and

transmitter means on-board each of said trucks for receiving said output data from said processor means and transmitting said output data to said central computer for further processing.

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D14 ~~87.~~ (Once Amended) An apparatus for measuring the weight of the load carried by the body of a truck, said apparatus comprising, in combination:

a truck body and a truck frame;

means for coupling said body to said frame to inhibit side-to-side or fore-to-aft movement of said body with respect to said frame but allowing liited non-rotating vertical movement; and

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a pressure sensor assembly supporting a predetermined portion of the weight of said body along an interface between said body and frame such that the weight of said body is transferred to said frame uniformly along said interface.

89. (Twice Amended) An apparatus as set forth in claim 88 wherein said processor means includes means for detecting a change in the weight of said truck body and formulating data indicative of said truck condition in response to said pressure data [and its monotonic change].

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90. (Once Amended) An apparatus for measuring the weight of a truck body and its load, comprising, in combination:

a truck frame supporting said truck body;

a pressure sensor assembly mounted on said truck frame and positioned along an interface between said truck body and frame for supporting a predetermined portion of the total weight of said truck body such that said assembly distributes said predetermined portion of the total weight of said truck body in a [substantially] uniform manner along said interface, said assembly providing a plurality of output signals indicative of the pressure at said interface between said body and frame;

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means on-board said truck and responsive to said plurality of output signals for formulating a single indication of the weight of said truck body and its load;

a display responsive to said means for indicating the weight of the load carried by said body.

91. (Twice Amended) An apparatus as set forth in claim 90 wherein said means includes means for subtracting a predetermined weight representative of [the] a tare weight of said body from said single indication of [the] a weight of said truck body and [its] said load.

95. (Twice Amended) A system for automatically measuring [the] a weight of a vehicle body [and its load] and automatically transferring [the weight] a measurement of said weight to a remote stationary site, said system comprising, in combination:

a vehicle frame for supporting said body;

a pressure sensor assembly mounted on said vehicle frame and positioned along an interface between said vehicle body and frame for supporting a predetermined portion of [the total] said weight of said vehicle body such that said assembly distributes said predetermined portion of [the total] said weight of said vehicle body in a substantially uniform manner along said interface, said assembly providing at least one output signal indicative of the pressure at said interface between said body and frame;

means remote from said vehicle for receiving said at least one output signal and formulating an indication of [the] said weight of said body [and its load]; and

coupling means joining said pressure sensor assembly and said remote means for automatically transferring said at least one output signal from said assembly to said remote site.

96. (Once Amended) A system according to claim 95 wherein said at least one output signal from said pressure sensor assembly is fluid under pressure and said remote means is a pressure responsive device [for providing] for providing a visual indication indicative of the weight of said body and said coupling means is a conduit for communicating the fluid under pressure from said assembly to said pressure responsive device remote from the vehicle.

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99. (Twice Amended) In a system utilizing pressurized tubing, an apparatus for terminating an end of said tubing and for insuring the termination is leak-proof under high pressures, said apparatus comprising, in combination:

an end clamp located at [the] said end of said tubing and comprising first, second and third portions;

said third portion of said end clamp located inside said tubing while said first and second portions fit over the outside of said tubing and oppose one another so as to sandwich said tubing and third [position] portion between said first and second portions;

means for joining said first, second and third portions of said clamp with said tubing so as to totally seal the end of said tubing; and

a collar surrounding said tubing at an area proximate [the] said end of said tubing but rearward of said end clamp, said collar having a central bore for receiving said tubing and restraining said tubing from changing its cross-sectional shape in the area of the tube under and adjacent to said collar.

100. (Twice Amended) In a system for monitoring hauling parameters of a vehicle with a dump body that pivots between raised and lowered pivotal positions, an on-board apparatus comprising, in combination:

a sensor mounted on said body and responsive to the [pivotal position] pivoting of said body for providing an output signal indicative of [the] said raised or lowered positions of said body, said sensor being totally encapsulated in a housing in order to prevent ambient conditions from reducing the responsiveness of said sensor;

a processor for receiving said output signal from said sensor and responding to said signals in a predetermined manner; and

means communicating said output signal from said sensor to said processor wherein said means includes an output port in said housing which maintains [the] said sensor in isolation from [its] an ambient environment.

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102. (Twice Amended) In a system for controlling the routing of each vehicle in a fleet of material-hauling vehicles to one of a plurality of possible load or dump locations, an apparatus for monitoring and commanding vehicle movement comprising, in combination:

means on-board each of said vehicles for sensing the beginning of a [the] loading of material into said vehicle and [the] a dumping of said material from said vehicle and, in response to said sensing, forming data indicative of said loading or dumping;

first transceiver means on-board each of said vehicles for transmitting said data;

a central computer having a second transceiver means for receiving said [transmittal] transmitted data from each of said vehicles and having a processor and a memory for formulating a data base from which control data is derived, said central computer including means for transmitting said control data to said vehicles, said control data including data identifying a particular vehicle and [for instructing the

operator of each vehicle of] a particular one of said plurality of possible load or dump destinations; and

said [on-board] first transceiver means [on each of said vehicles] receiving said control data and said on-board sensing means responding to said control data to visually indicate to [the vehicle operator] said particular one of said plurality of possible load or dump destinations on an on-board display means.

105. (Once Amended) An apparatus as set forth in claim 103 wherein said means (1) comprises a pressure sensor assembly mounted to a frame of said vehicle for transferring from said dump body to said frame at least a predetermined portion of [the total] said weight of said dump body in a substantially uniform manner along an interface between said frame and said dump body and said assembly is responsive to said predetermined portion of [the total] said weight to provide pressure date representative of [the] said weight of said dump body.

REMARKS

In the Office Action of August 21, 1987, all of the pending claims were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. More specifically, the Office Action includes what is characterized as a partial list of elements that appear in the claims without proper antecedent basis. Applicant must confess that the precise nature of the objections under §112 are not fully understood or appreciated. Apparently, the Examiner is objecting to the use of the article "the" followed by a noun or gerund when the noun or gerund is first used in a claim. Where a simple change to the article "a" or "an" is grammatically proper, such a change has been made in this amendment. Where this simple change